SHRI MATA VAISHNAV DEVI UNIVERSITY
MECHANICAL ENGINEERING DEPARTMENT

Entry	No.	1	8	B	M	E	0	4	4

Subject: MEL 2014   SOM   **Dec. 2019**
Max. Marks: 50   Major   **Time: 3 Hrs.**

Note:

1. *Assume reasonable values of missing data.*
2. *Mobile phones are not allowed. Hand over these to the invigilation staff.*

Q1) Answer the following:

    a) Derive the relationship between Bending moment, Shear force and Load of a beam.
    b) What are the assumptions in simple beam bending theory? (3)
    c) Write the stress strain relation for 3 – D state of stress. (4)

Q2) A simply supported beam 'AB' of length **L** carries a uniformly distributed load of intensity 'w' starting from a distance of **L/4** from the left end 'A' and ending **at mid-span**. Deduce the expression for slope and deflection at any point. (10)

Q3) A Cantilever beam of 6m length carries two concentrated loads of **5 kN** and **10 kN** at a distance of **2m** and **4m** respectively from the built-in end. Determine the maximum deflection by moment area method. (10)

Q4) The outer and inner diameters of a hollow steel shaft are **120mm** and **60mm** respectively. The shaft transmits **800 kW** at a speed of **400 rpm**. Determine the bending moment which can be safely applied to the shaft if the maximum principal stress is not to exceed **80 MPa**.

Q5) A **4m** long circular bar deflects **20mm** at the centre when used as a simply supported beam under a **200N** load at the Centre. Determine critical load for the same bar when used as a column pinned at both the ends. (10)

CO 1	Are able to draw internal forces diagrams of structure members.	Q2, Q3
CO 2	Have learnt to draw free body diagram of structural members.	Q1, Q2, Q3
CO 3	Are able to analysis various structural members subjected to different loads.	Q2, Q3, Q4, Q5
CO 4	Are able to calculate stress and strains of structural members.	Q4, Q5